

## HEADGEAR HAVING ROTATABLE LIGHT ASSEMBLY

### BACKGROUND OF THE INVENTION

There are a number of problems with currently  
5 available helmet lights. The light itself tends to be large  
and heavy. Also, as the light may protrude ten centimeters  
or more from the helmet, and does not easily disconnect, it  
presents a snagging hazard. For firefighters and others who  
rely on helmet lights, a snagging hazard could be deadly,  
10 as it could force the firefighter to either stay in place  
at a dangerous moment, or proceed without his helmet, a  
much needed item.

In addition, although helmet mounting fixtures  
for illumination sources (typically a flashlight) with many  
15 degrees of freedom of adjustment appear to be available,  
the relatively large mass of the typical flashlight  
requires that the joints of these fixtures be fairly stiff,  
to hold the flashlight in a stationary orientation during  
normal use. This means, however, that when it is desired to  
20 change the direction in which the light is pointing, it is  
necessary to exert a relatively large force on the  
flashlight to overcome the joint stiffness. Alternatively,  
the firefighter may need to loosen a fastening screw in  
order to adjust the angle of the light. This may be very  
25 difficult to do when wearing the heavy gloves that  
firefighters wear when confronting a blaze. In emergency  
situations every second and every motion may be important.  
Accordingly, if it takes longer to make an adjustment than  
would otherwise be necessary this could make a difference  
30 to the overall success of the emergency response operation.

Moreover, a firefighter's suite of equipment  
presents a heavy burden to a firefighter. Accordingly, it

is undesirable to add to this burden with the currently existing systems that permit multi-axis adjustment of the illumination source, as every additional gram of mass is an added burden to the firefighter.

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#### SUMMARY OF THE INVENTION

In a first separate aspect, the present invention is a headgear assembly that includes an article of headgear and an illumination assembly mounted on the article of  
10 headgear. The illumination assembly, in turn, includes an illumination source mounting assembly having a base that is attached to and supported by the article of headgear. A rotatable portion is rotatably supported by the base about at least one axis of rotation. An illumination source is  
15 supported by the rotatable portion and has a mass of less than 50 grams (weighs less than 1.77 ounces).

In a second separate aspect, the present invention is a headgear assembly that includes an article of headgear and an illumination assembly mounted on the  
20 article of headgear. In turn, the illumination assembly includes an illumination source mounting assembly having a base that is attached to and supported by the article of headgear. A rotatable portion is rotatably supported by the base, the rotatable portion being rotatable about at least  
25 one axis of rotation. Finally, an illumination source is supported by the rotatable portion and has a length of less than 6 cm (2.36 in) along its greatest dimensional extent.

In a third separate aspect, the present invention is a method of retrofitting a safety helmet to include a  
30 rotatable illumination source. The method includes providing a rotatable illumination source assembly having a base and adhering the base to the safety helmet.

In a fourth separate aspect, the present invention is a headgear assembly that includes an article of headgear and an illumination assembly mounted on the article of headgear. The illumination assembly, in turn,  
5 includes an illumination source mounting assembly having a base that is attached to and supported by the article of headgear. A rotatable portion is rotatably supported by the base about at least one axis of rotation. An illumination source is supported by the rotatable portion. In addition  
10 the illumination assembly protrudes from the side of the article of headgear by no more than six centimeters.

In a fifth separate aspect, the present invention is a headgear assembly that includes an article of headgear and an illumination assembly mounted on the article of  
15 headgear. The illumination assembly, in turn, includes an illumination source mounting assembly having a base that is attached to and supported by the article of headgear. A rotatable portion is rotatably supported by the base about at least one axis of rotation. In addition, it is not  
20 necessary to loosen any element in order to adjust the pointing angle of the illumination source.

In a sixth separate aspect, the present invention is a method of retrofitting a safety helmet having a visor to include a rotatable illumination source. The method  
25 includes providing a rotatable illumination source assembly having a base in the form of a clip and physically attaching the base to the visor.

In an seventh separate aspect, the present invention is a safety helmet bearing a rotatable  
30 illumination source assembly and wherein at least a portion of said rotatable illumination source assembly will snap off under a torque of greater than 1 newton meters.

The foregoing and other objectives, features and advantages of the invention will be more readily understood upon consideration of the following detailed description of the preferred embodiment(s), taken in conjunction with the  
5 accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a helmet having an illumination source assembly, according to the present  
10 invention.

FIG. 2 is an exploded isometric view of the illumination source assembly of FIG. 1.

FIG. 3 is an isometric view of the illumination source assembly of FIG 1, showing the assembly in a first  
15 position.

FIG. 4 is an isometric view of the illumination source assembly of FIG 1, showing the assembly in a second position.

FIG. 5 is a side view of an alternative preferred  
20 embodiment of an illumination source assembly clipped to a corner of a helmet visor.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

25 Referring to FIG. 1, in a preferred embodiment a helmet 10 having a visor 13, is equipped with a rotatable illumination source assembly 12. Although the assembly 12 is shown attached to the visor 13 of the helmet 10, in alternative preferred embodiments it is attached to the  
30 front face 14 or the side 16 of the helmet 10.

Referring to FIGS 2-4, assembly 12 includes a compressibly deformable adhesive element 20, adapted to

facilitate the attachment of assembly 12 to a helmet. A helmet may indeed be easily retrofitted to include assembly 12 simply by adhering assembly 12 to the desired portion of the helmet.

5           Attached to adhesive element 20 is a post bearing structure 22, which together with element 20 forms a base. An illumination source mounting element 26 having two arms 27 is rotatably mounted about post 24 of structure 22. In turn an illumination source 28 is rotatably mounted by way  
10 of apertures 29 in arms 27 of mounting element 26. Mounting element 26 can be rotated 360° about post 24 and the illumination source 28 can be rotated approximately 200° about the axis defined by apertures 29.

          Illumination source 28 is preferably a flashlight  
15 having a push-toggle on-off switch 30 and two light emitting diodes 32, and has a mass of about 30 grams (weighs slightly more than an ounce). Additionally, illumination source 28 is in the form of a slightly modified solid rectangle having a length of about 3.5 cm  
20 (1.38 in), a width of about 3 cm (1.2 in) and a thickness of about 1 cm (0.4 in). Assembly 12 is preferably made of lightweight polymer material having a relatively low strength, so that it will break easily and not constitute a snagging hazard. Moreover, the entire assembly 12 protrudes  
25 from the side of the helmet by less than 3 cm (1.2 in), far less than other available illumination source assemblies. Moreover, it is not necessary to loosen any element in order to change the pointing direction of illumination source 28.

30           The advantages of this arrangement should now be evident. Because source 28 is so lightweight, its inertia is low and it can be mounted in a less rigid manner than

heavier flashlights. This is an important advantage to an emergency response person who may need to very quickly change the direction in which source 28 is pointing.

Moreover, because it is lightweight, source 28 assembly 12  
5 can be made of polymer material, which will easily break or snap off in the event that an element of source 28 becomes snagged on a protrusion. Such an incident can prove fatal to a firefighter, as it forces him to lose precious seconds and/or could result in his proceeding without his helmet.

10 In one preferred embodiment, assembly 12 breaks or snaps off the remainder of helmet 10 under a torque of greater than 1 newton meter. In an alternative preferred embodiment, assembly 12 breaks or snaps off under a torque of greater than 10 newton meters. In yet another preferred  
15 embodiment, assembly 12 breaks or snaps off under a torque of greater than 100 newton meters. In still another alternative preferred embodiment, assembly 12 breaks or snaps off under a torque of greater than 0.1 newton meters. In a yet further alternative preferred embodiment, assembly  
20 12 breaks or snaps off under a torque of greater than 1000 newton meters.

Referring to FIG. 5, in an alternative preferred embodiment, assembly 12 is provided pre-joined to a clip 50 that mechanically attaches (clips) to a corner of the visor  
25 13, without the use of adhesives.

The terms and expressions that have been employed in the foregoing specification are used as terms of description and not of limitation. There is no intention, in the use of such terms and expressions, of excluding  
30 equivalents of the features shown and described or portions thereof, it being recognized that the scope of the

invention is defined and limited only by the claims which follow.